

1/20

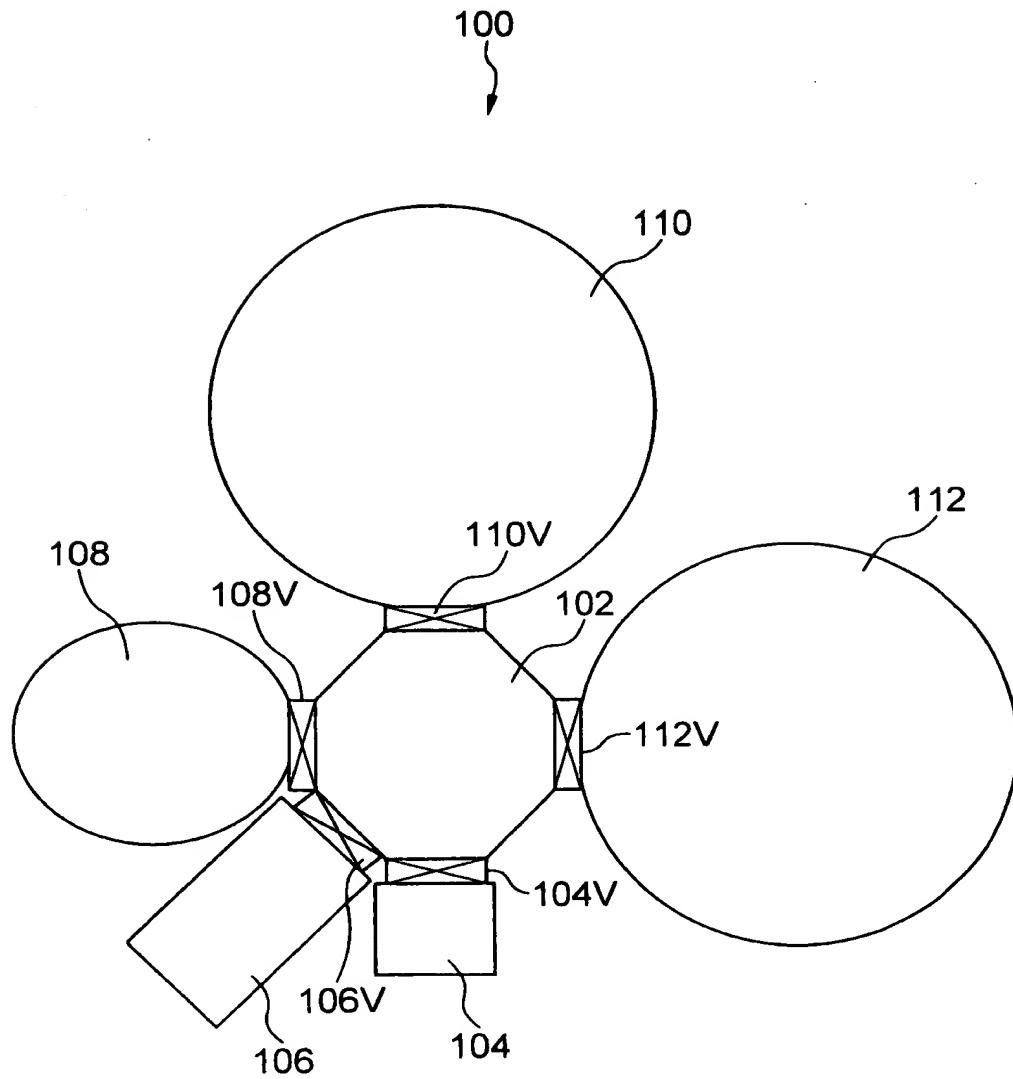


FIG. 1

2/20

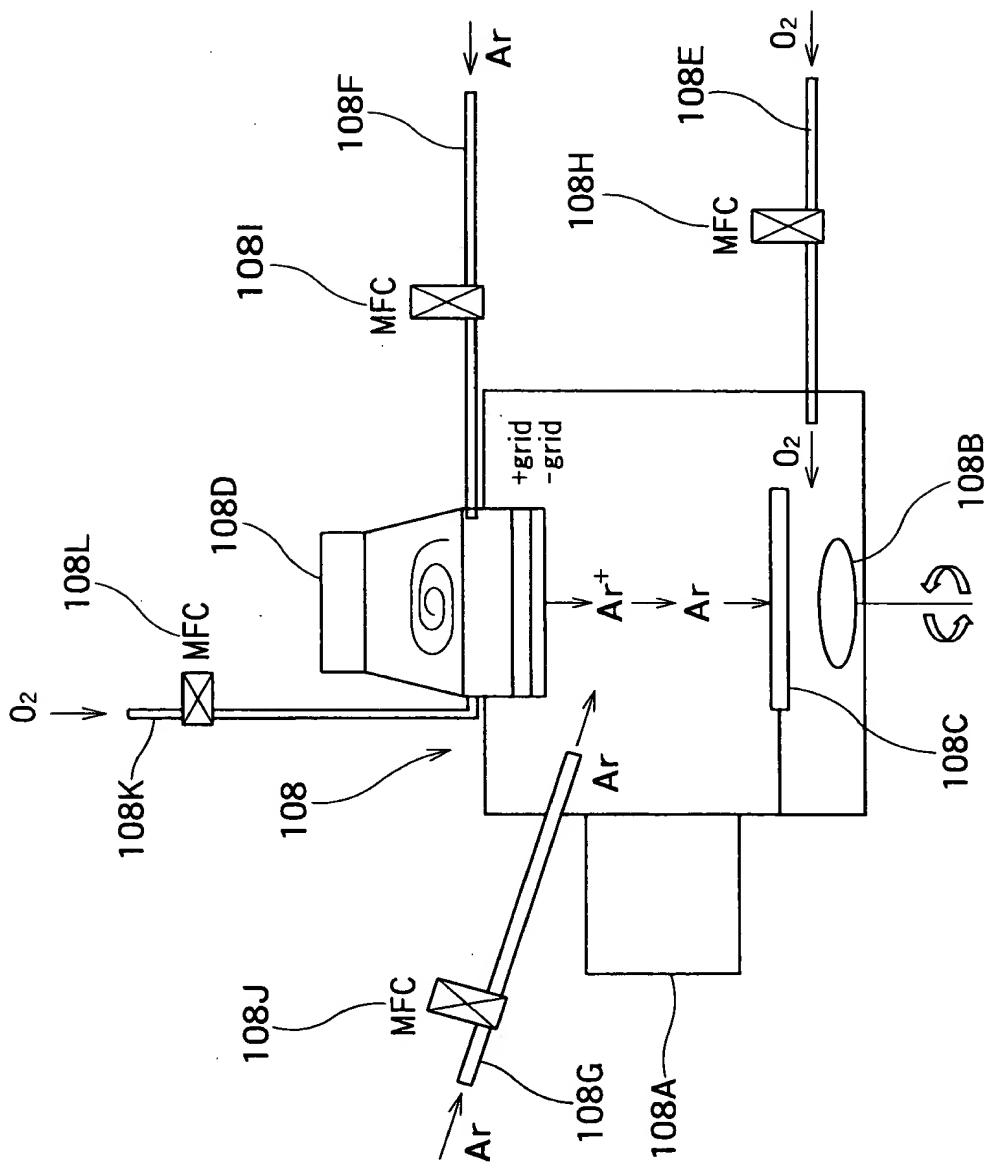


FIG. 2

3/20

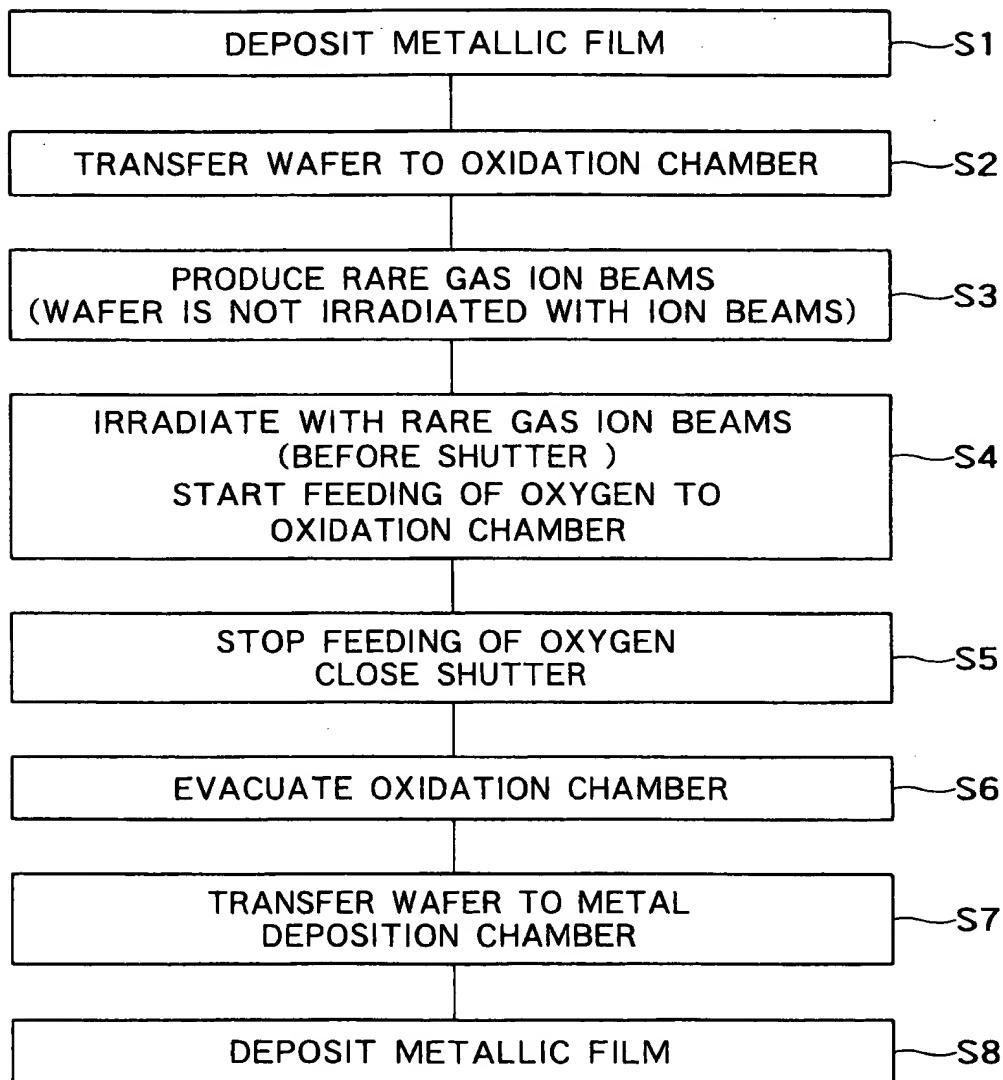


FIG. 3

4/20

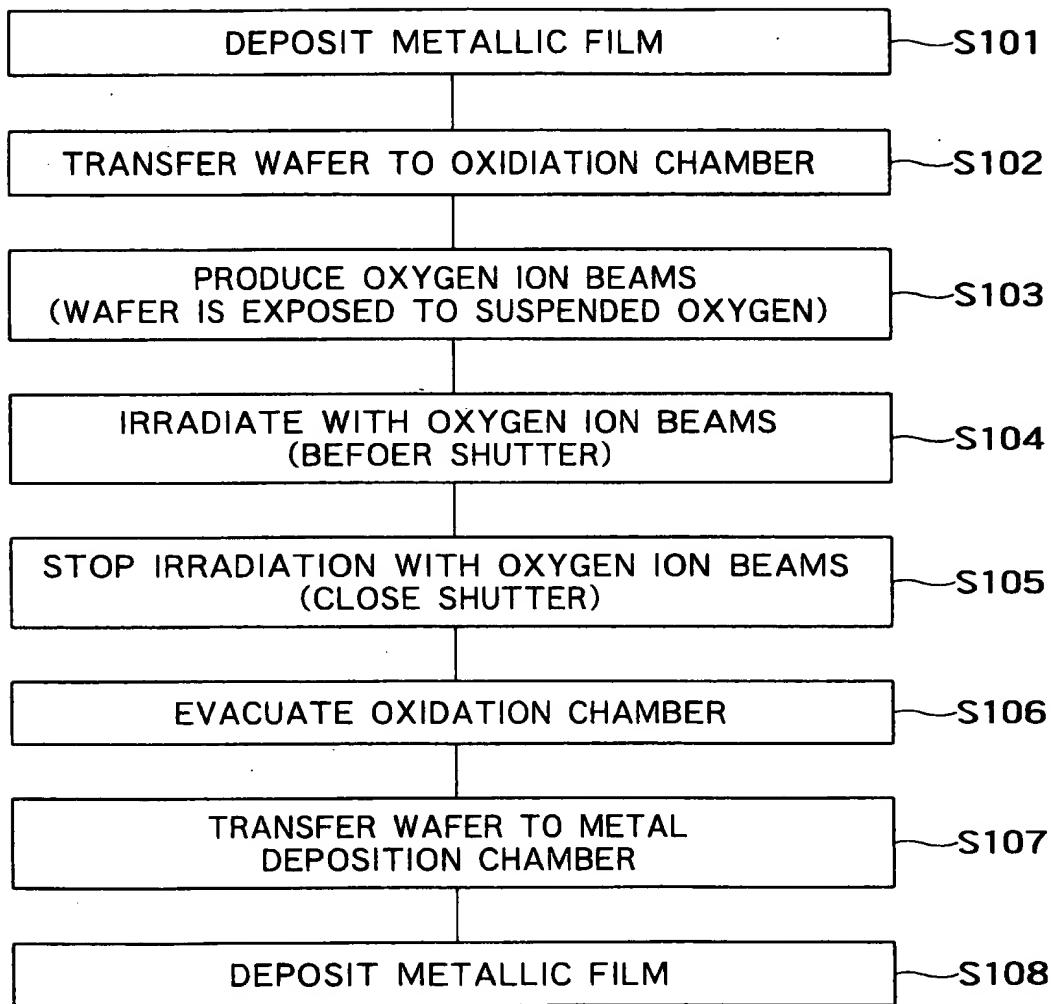


FIG. 4

5/20

(a)	(b)	(c)
SMALL Ar ENERGY (NO METAL MILLING EFFECT) $V_+ \sim 50\text{eV}$	OPTIMUM Ar ENERGY (METAL MILLING EFFECT EXISTS) $V_+ \sim 100\text{eV}$	MAXIMUM Ar ENERGY (LARGE METAL MILLING EFFECT) $V_+ \sim 150\text{eV}$
ONLY DESORB OXYGEN ABSORBED INTO SURFACE OF FILM BY IRRADIATION WITH Ar	CUT BONDING TO SURFACE METAL BY IRRADIATION WITH Ar TO MAKE ACTIVE SURFACE TO PROMOTE RE-BONDING TO OXYGEN	STRONG MILLING EFFECT BY IRRADIATION WITH Ar → SURFACE OF METAL IS SCRAPED WITHOUT FORMING OXIDE
OXIDATION REACTION NOT HAPPEN	NO SUSPENDED OXYGEN, STABLE OXIDE IS FORMED	

FIG. 5

6/20

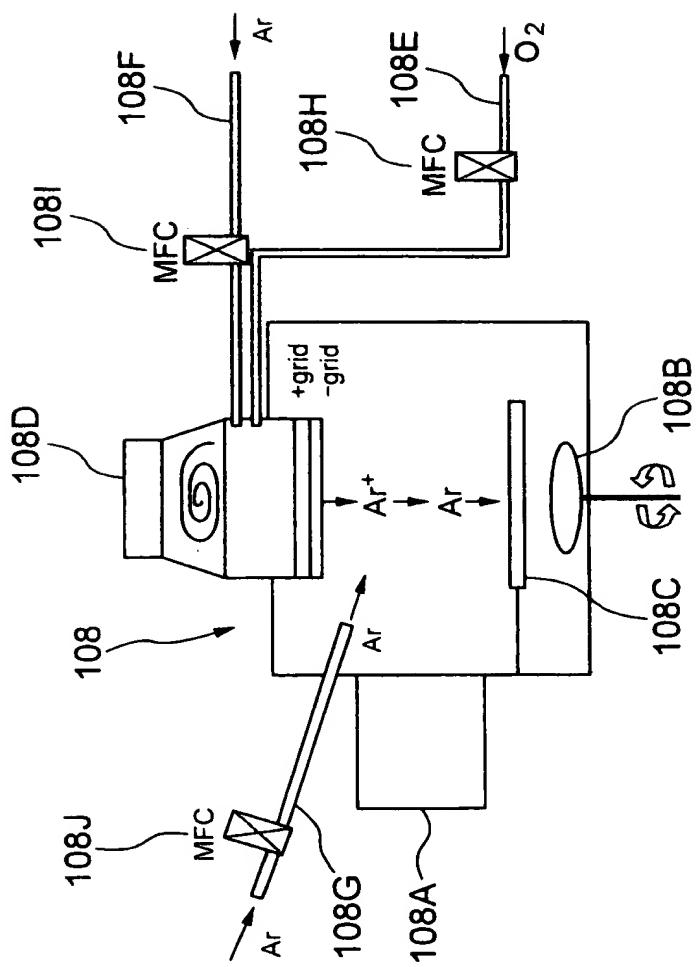


FIG. 6

7/20

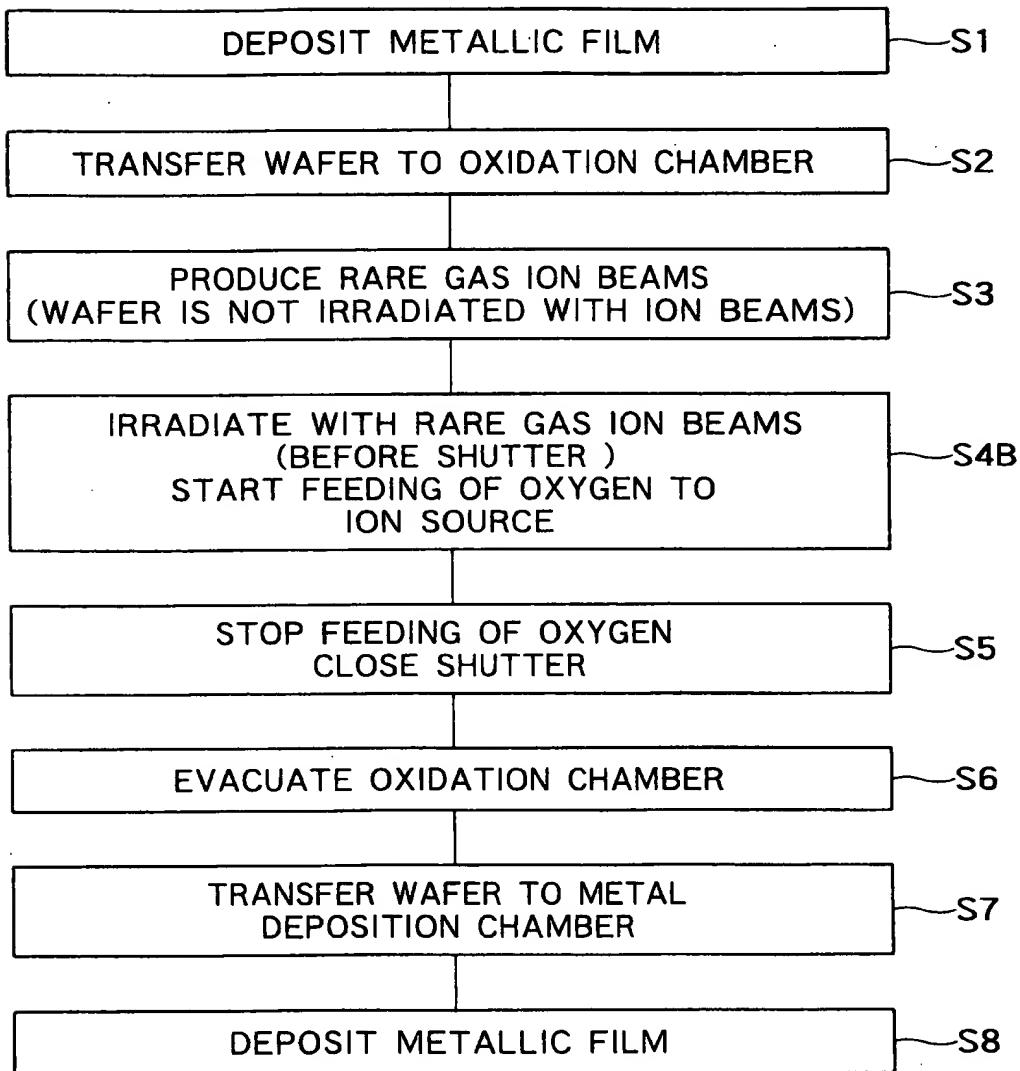


FIG. 7

8/20

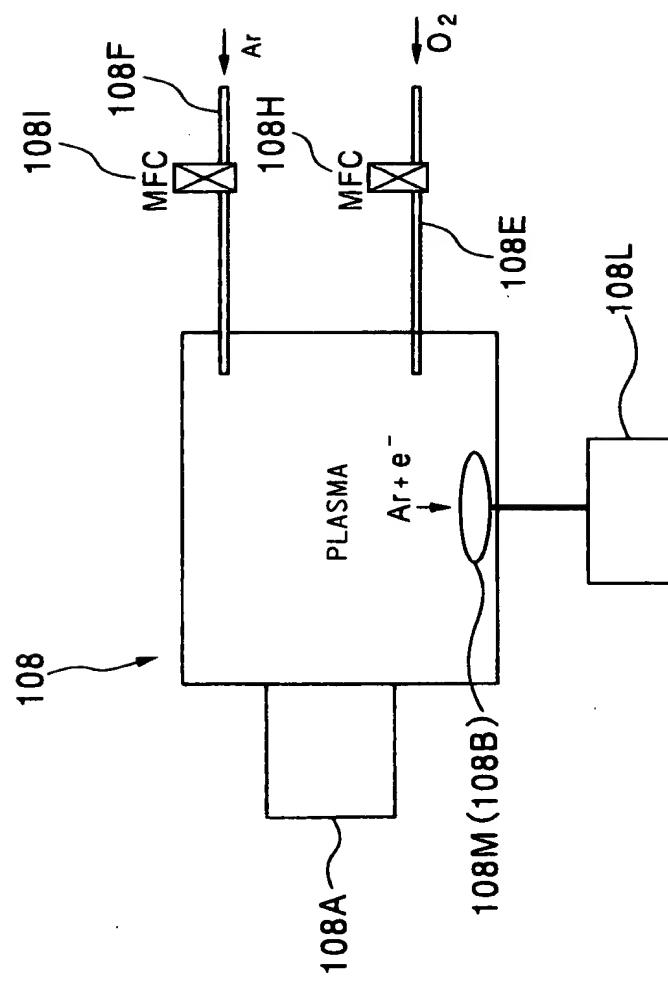


FIG. 8

9/20

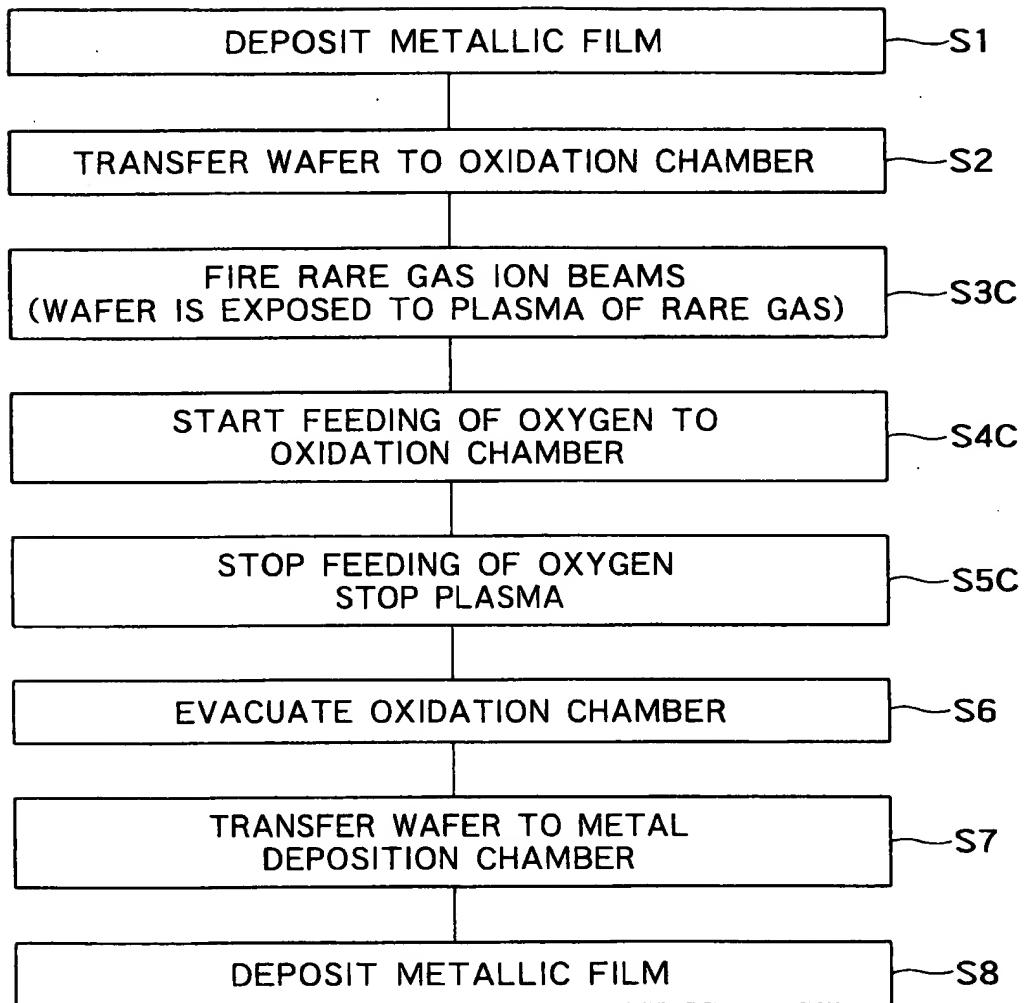


FIG. 9

10/20

FIG. 10

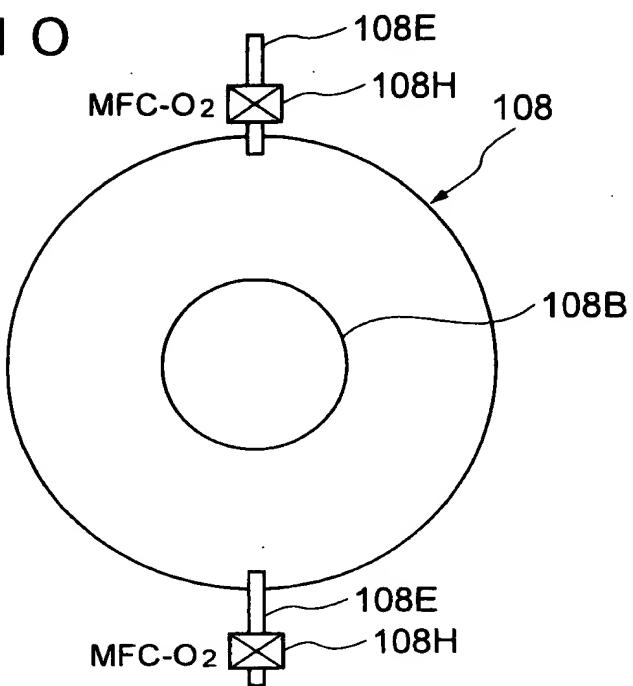
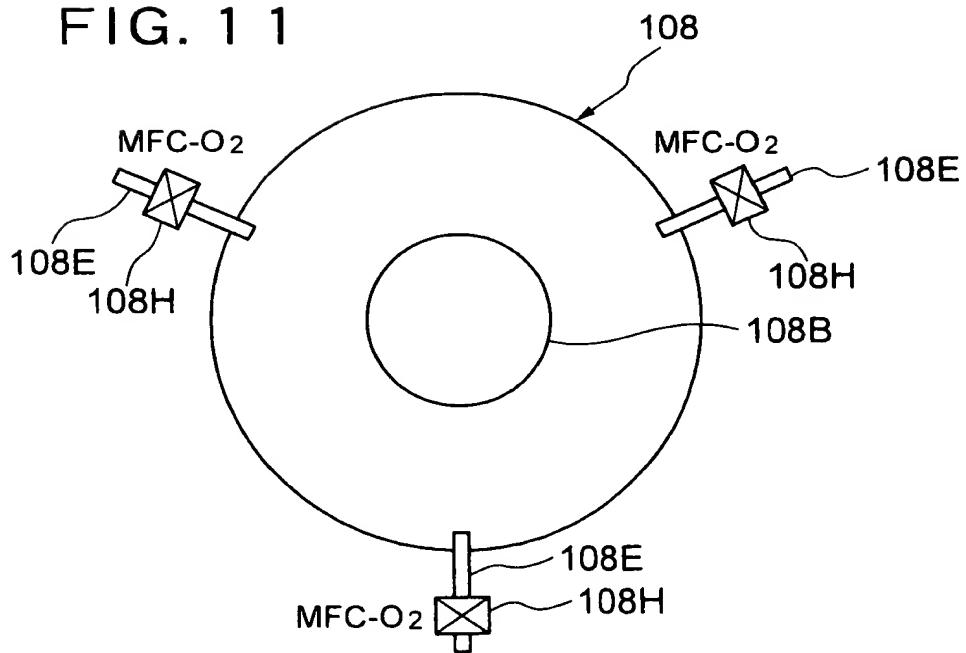


FIG. 11



11/20

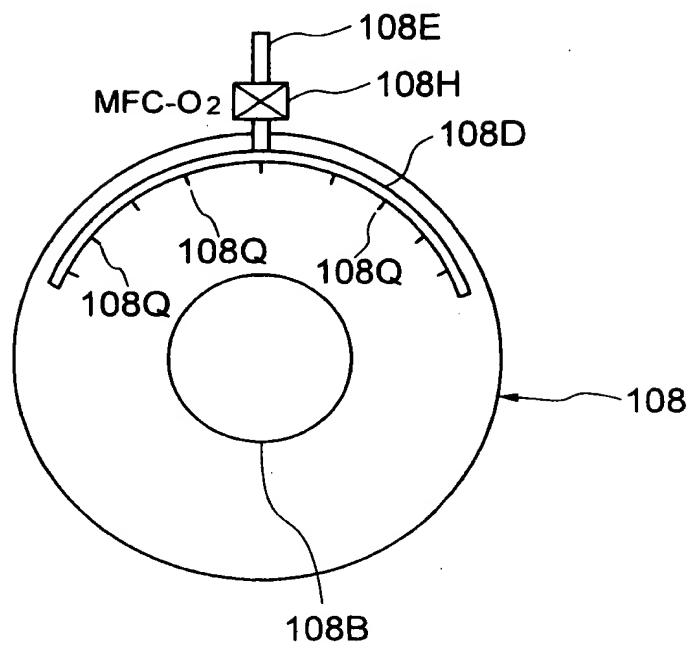


FIG. 12

12/20

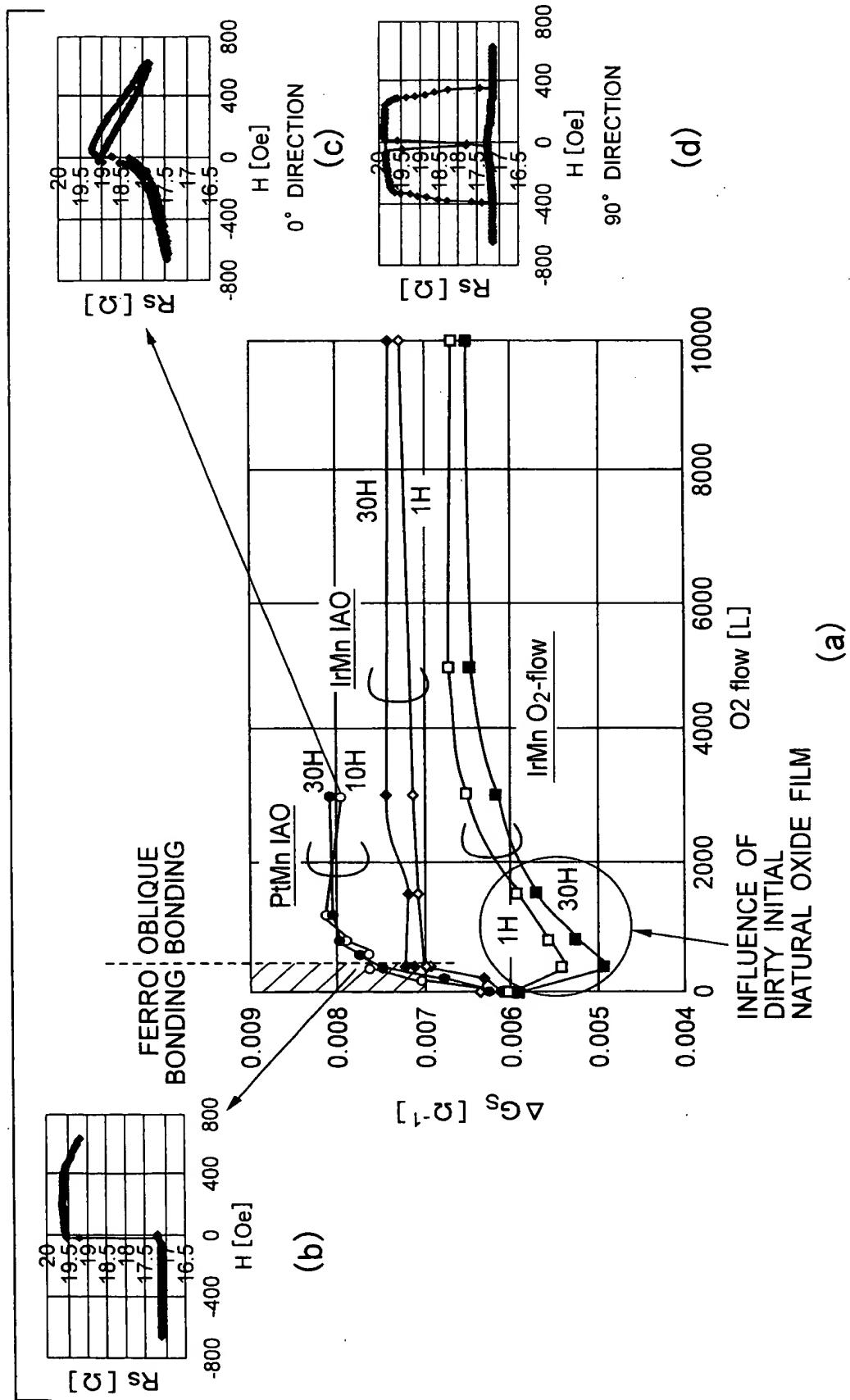


FIG. 13

13/20

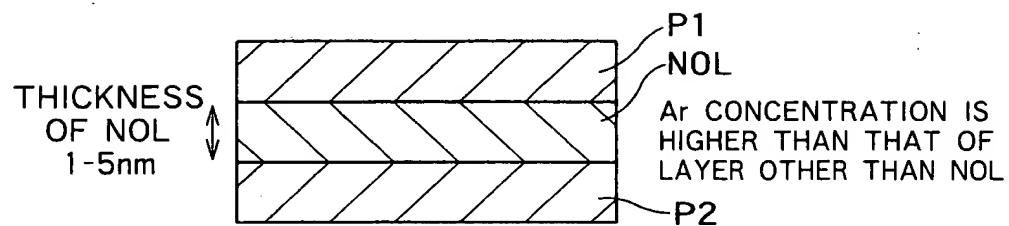


FIG. 14

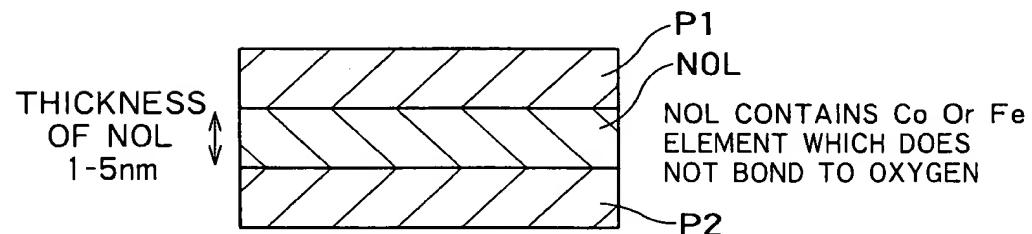


FIG. 15

14/20

SENSE CURRENT

→

Free-NOL (1.5)
Spin-filter (Cu 1)
Free (CoFeNi 2)
Spacer (cu 2)
Pin (CoFe 2)
Pin-NOL (1.5)
Pin (CoFe 0.5)
Ru 0.9
Pin (CoFe 1.5)
Antiferro (PtMn 10)
Seed (NiFeCr 3)
Buffer (Ta 3)

FIG. 16

15/20

SENSE
CURRENT



Free-NOL (1.5)
Spin-filter (Cu 1)
Free (CoFeNi 2)
Spacer (Cu 2)
Pin (CoFe 2)
Pin-NOL (1.5)
Pin (CoFe 0.5)
Ru 0.9
Pin (CoFe 1.5)
Antiferro (PtMn 10)
Seed (NiFeCr 3)
Buffer (Ta 3)

FIG. 17

16/20

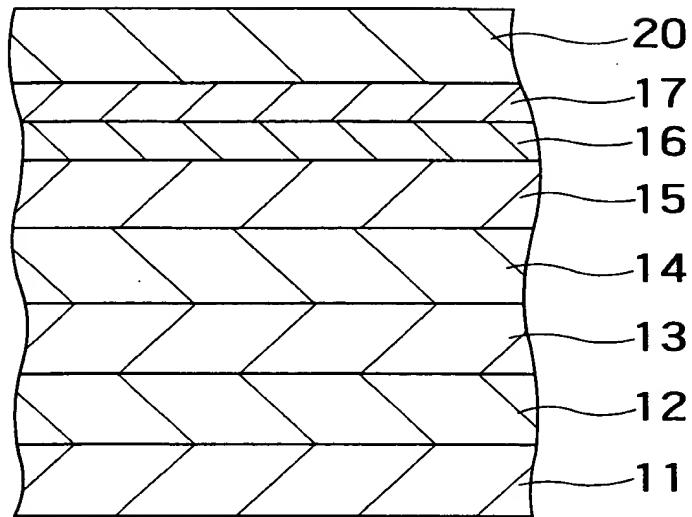


FIG. 18

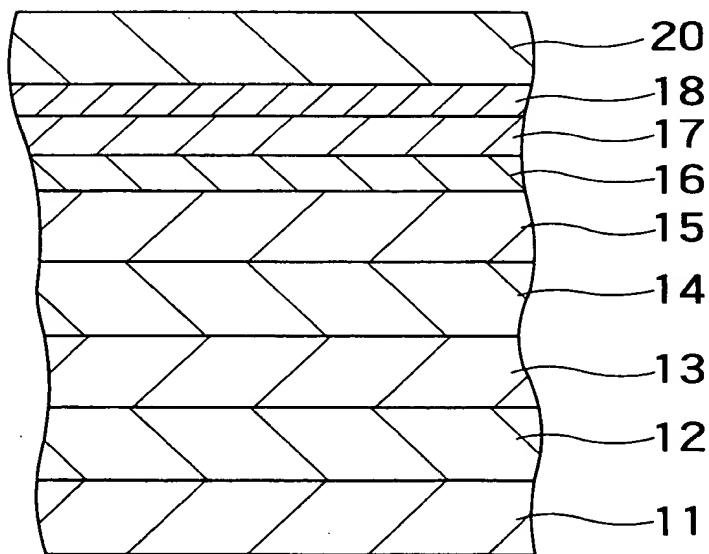


FIG. 19

17/20

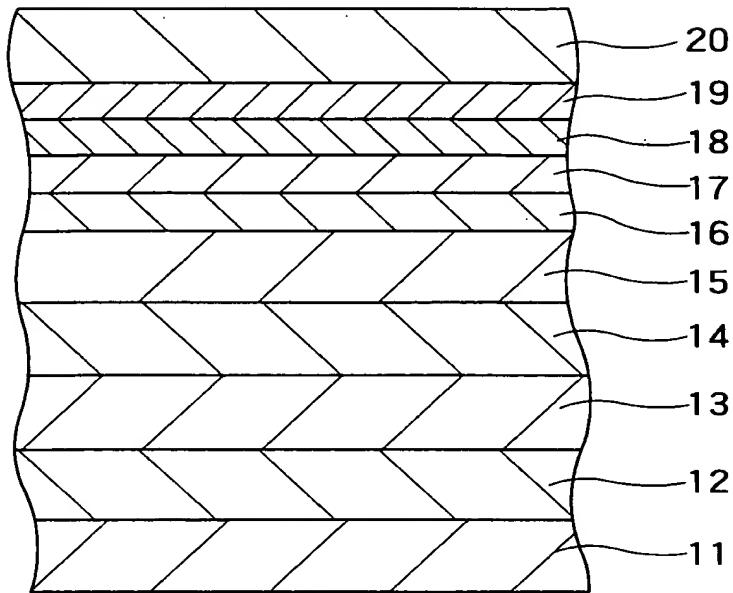


FIG. 20

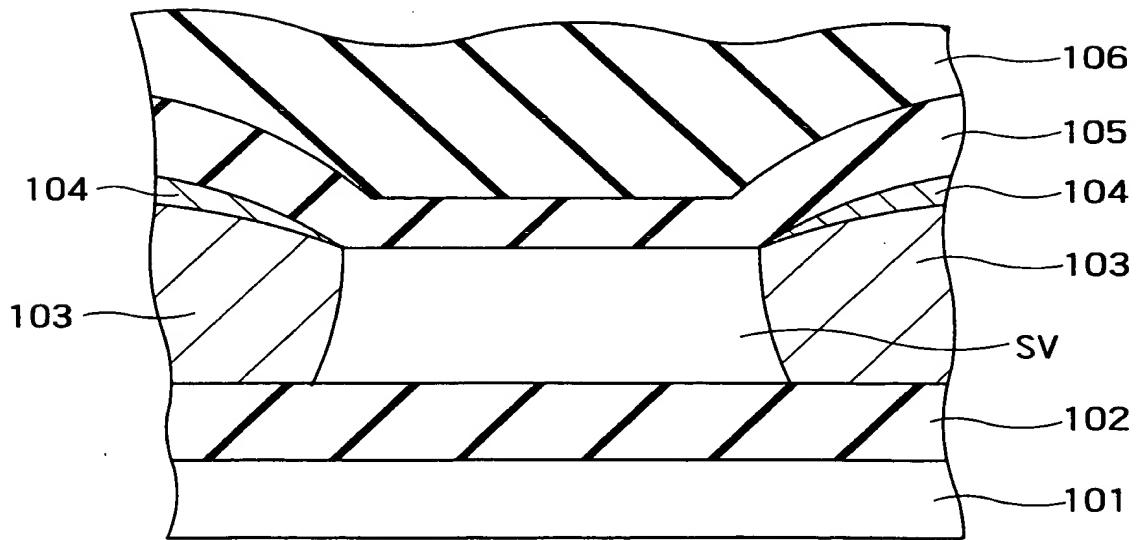


FIG. 21

18/20

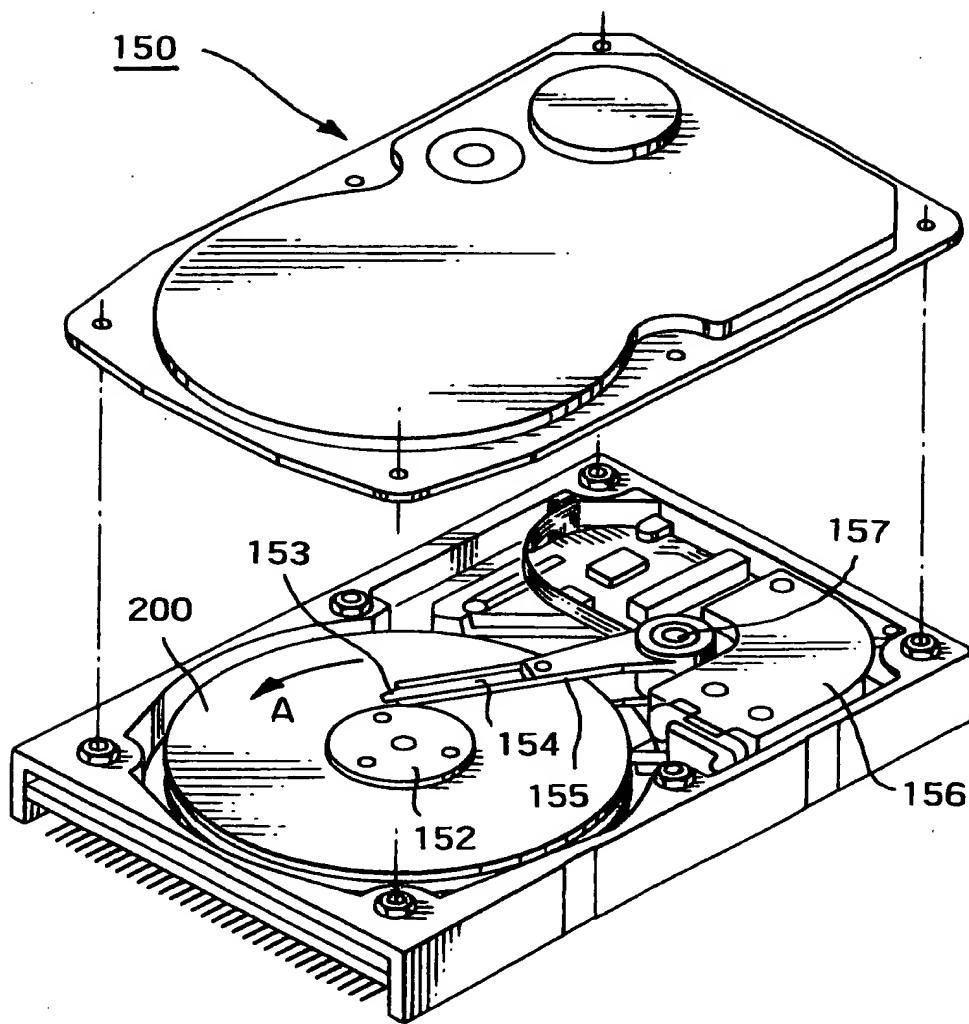


FIG. 22

19/20

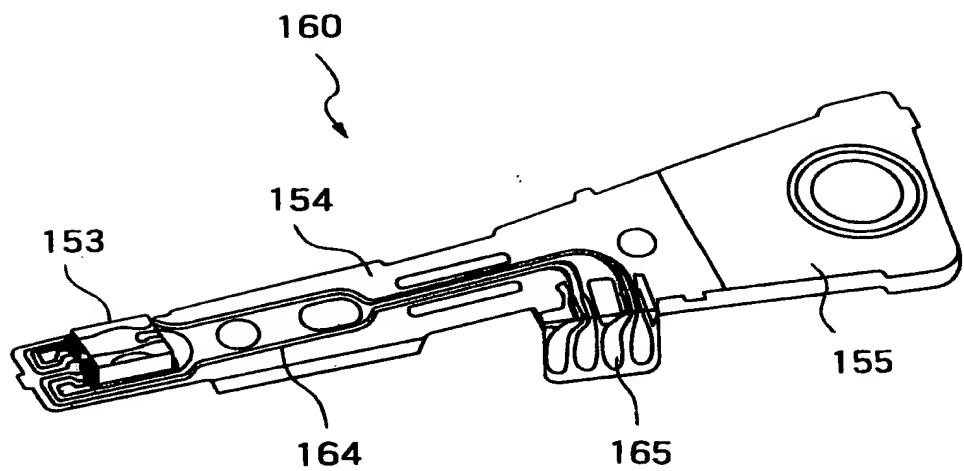


FIG. 23

20/20

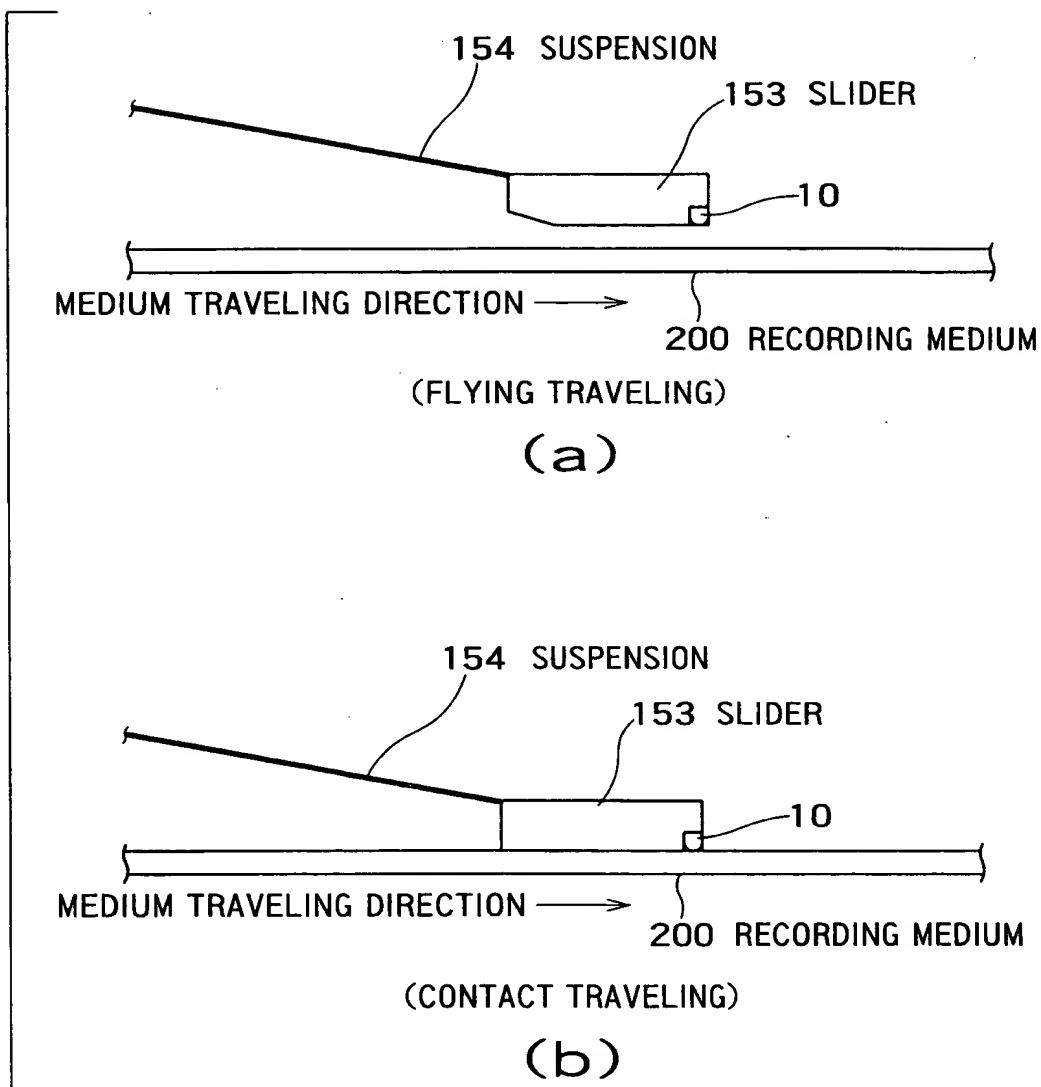


FIG. 24